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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

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U. S. Department of Agriculture

COMBINED MONTHLY REPORT
BRANCH OF RESEARCH

FOREST EXPERIMENT STATIONS
DENDROLOGY
FOREST PRODUCTS
FOREST ECONOMICS
GRAZING RESEARCH

OCT 1926

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COMBINED MONTHLY REPORT

BRANCH OF RESEARCH

October, 1926

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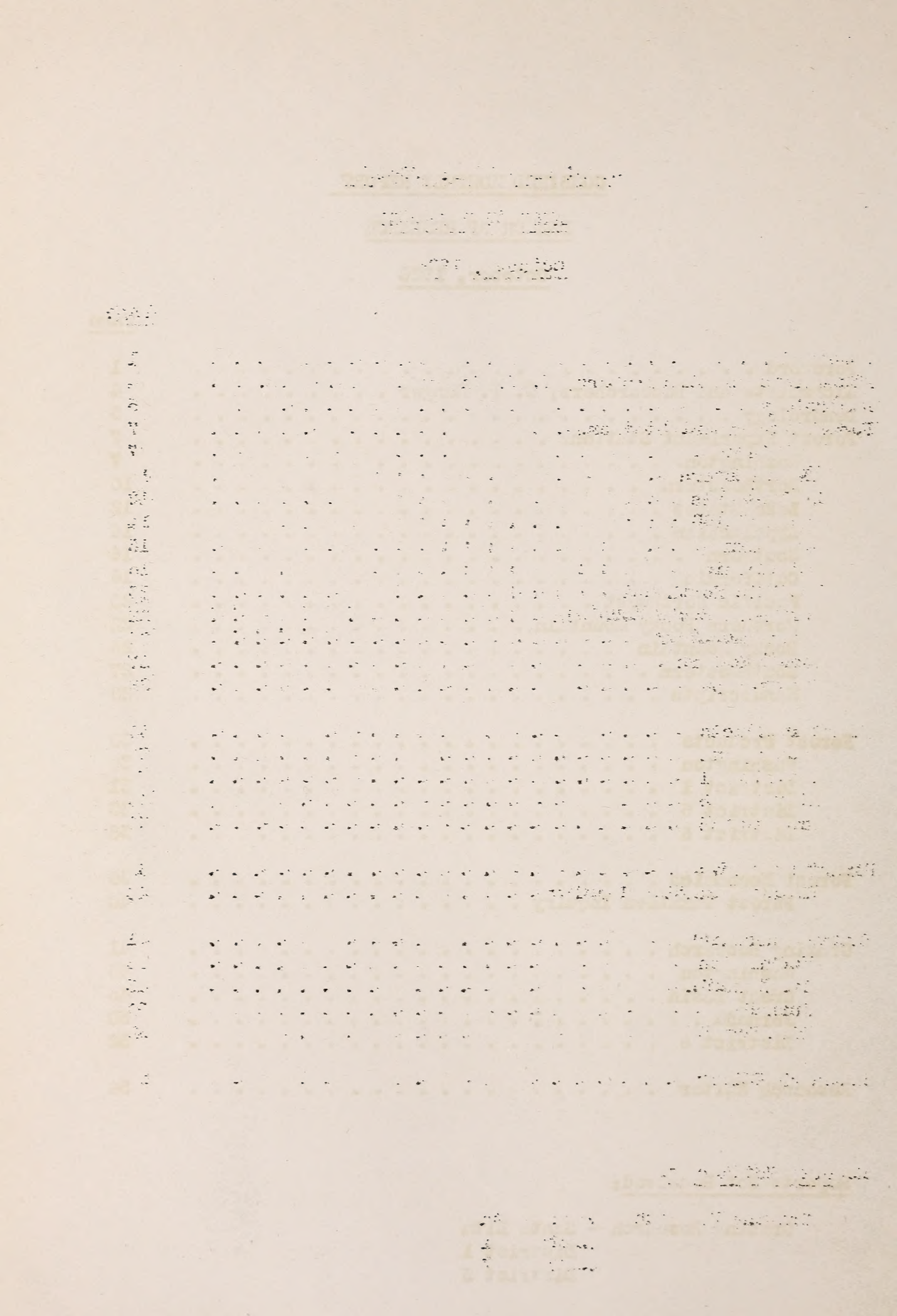

COMBINED MONTHLY REPORT

BRANCH OF RESEARCH

October, 1926

FOREWORD

Administration of Experiment Station Work by Projects

By E. W. Allen

Experiment station work, like any serious enterprise, requires organization, administration and business management. After perfecting its organization, bringing together a staff and securing opportunity for its members to work under advantageous and stimulating conditions, the most important features of station administration center in its work. This includes, of course, its planning, supervision and publication, and the handling of the funds to meet its needs economically.

The use of station funds finds its justification not merely in the maintenance of laboratories, or model stables, or well-cared for fields, but in productive experiment and research. The work determines the disposition of the funds. Hence it is a function of the director to know what the various men of his staff are doing or proposing to do, and to direct their energies into profitable avenues.

None of our stations are large enough to attack all of the agricultural problems of their localities simultaneously. A selection has to be made, with a view to the needs of science and of agriculture in that locality. Some things are relatively more important and pressing than others. Some demand immediate attention while others can wait. The determination of the things to be undertaken, the consideration of the money required, and the fitting of these efforts into a broad general plan is the responsible and discriminating duty of the director.

When our stations were smaller and their work of simpler nature the details of station administration could be carried under the director's hat, and there were less things to distract him from his special charge. Now, however, there is need of more formal and systematic arrangements. System and organization are necessary to enable him to maintain a contact and familiarity with the station's business necessary to its efficient administration.

The activity of an experiment station is made up of a variety of separate undertakings--its lines of work, or, more specifically, its projects. Formerly the line of work was the unit, and these lines were grouped together for administrative purposes into departments. But as

time has gone on the problems have narrowed down, and the purpose and plan have become more clearly defined. Lines of work have been split up into projects, and departments have often been divided into specialties. This segregation and definition is an important step in the organization of the work, and rightly managed is a great administrative help. It serves to individualize the various activities and furnishes a catalogue of them which tells the whole story at a glance.

Individual projects may be limited to a single department, or they may require the combined attention of two or more departments. But because the project stands for a definite effort it has been found a convenient unit in planning, financing and supervising station work. To be effective, the project must be clearly defined and definite, or it is no advantage over the broader line of work. A project is not a desultory, rambling, vacillating effort, but it has a clear purpose, is restricted in scope, and systematic in its plan. It is designed to be constructive, and to advance on the basis of what is already known. It is not undertaken because "everybody's doing it," and it is not to be regarded as an endurance test, as some have seemed to think. It is developed out of a knowledge of what others have found, in fact and in technique, and a study of the best means of attack. It should be scientifically sound and technically fit, no matter how simple, and it should justify itself at the outset by giving reasonable promise of success. It is not an inflexible series of cut-and-dried plans, but it is the best that can be devised at the time, and it is subject to modification or amendment as new light is gained.

The purpose, scope and plan of a new project may be explained by talking the matter over, but this is not satisfactory, as it gives no basis for proper study and no record of the undertaking. It is far easier and safer to consider such matters in written form than verbally, and it is highly important that new work should receive formal consideration as to its merits, its desirability, and the feasibility of entering upon it. This may involve calling in assistance. It is better to have criticism in advance than after the work has been done. If the work is approved the director becomes responsible for it as a feature of the station program.

Many station men seem averse to outlining their proposed work, and maintain that it is impossible to anticipate results or the course which an investigation will take. This is not essential or expected, but it is feared the objection comes most often from those who are not clear in their own minds what they are actually aiming at, or have not thought out their method of attack. There is no desire to burden an investigator unduly, or to tie him to a set of plans or encourage him to anticipate results; but rather to encourage thorough preparation, which will give confidence at the outset and avoid unnecessary mistakes or waste due to thoughtless oversight. The suggestion of a new project presupposes sufficient study to state the problem clearly and to construct a plan and a general method of attack. How else can a director know what he is being asked to approve, or judge as to the merits of the undertaking or what it will ultimately involve?

It is entirely feasible, also, to elaborate a project so as to show its requirements in the way of land, teams and labor, special facilities or additional assistance, cooperation with other branches of the station, etc. It is the part of good administration to have these matters considered in advance, so that adequate provision may be made. These things will furnish a basis for estimating the amount of funds which should be assigned or set aside for its legitimate needs. If this is not done the project may suffer before the year is over. This danger is not merely a theoretical one.

Station projects vary much in grade. What is said is not intended to apply merely to the research activities; it applies equally to the ordinary experiments. We have become accustomed to outlining the more intricate and technical undertakings, but the project plan has not generally been extended to all features of the work. Unfortunately the plans of very many of the simpler experiments have never been reduced to writing. There is quite as much need for it, however, as in the case of the more elaborate investigation, for these experiments are relatively expensive, they often follow conventional methods without query as to their suitability, and once started they are apt to run on indefinitely. If station work is to be really progressive it must give more consideration to the ordinary experiments and their methods, to determine their profitability and their fitness to yield results which can be given a scientific interpretation. If a thing is worth doing, it is worth outlining and describing as a project, giving a place in the record and expecting a report.

The project outline also serves another purpose, that of controlling investigation or preventing its running off unnecessarily into side lines and leaving the main issue to languish. It affords a means of following up the work, and of holding men to the main purpose. There is abundant need for this. Some measure of sympathetic supervision and control is an administrative necessity, and this can be accomplished with the least friction and misunderstanding when the project outline is used as a basis.

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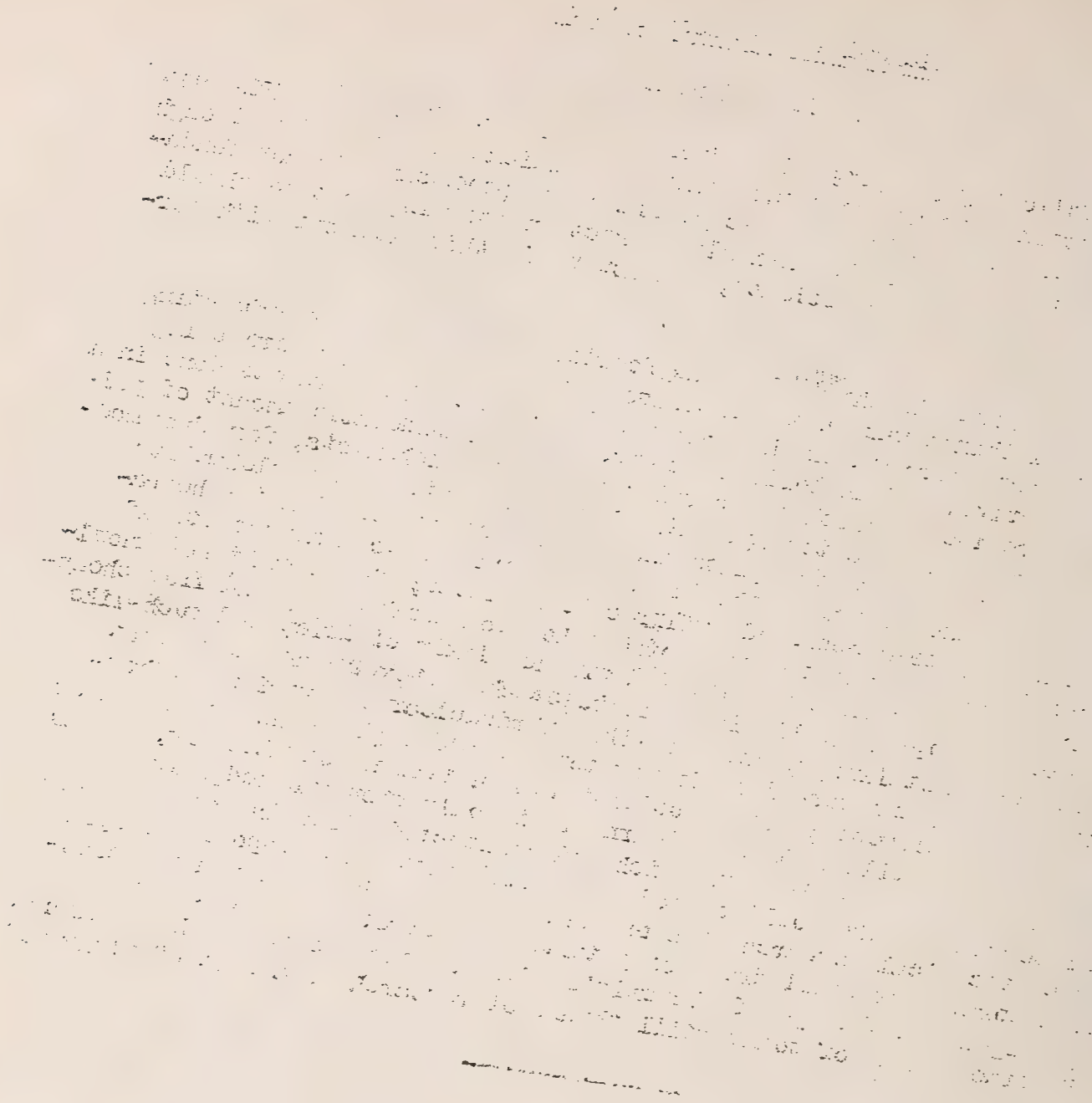
Alchemists and Researchers

By T. T. Munger

The following paragraph is taken from Wells's "Outline of History." It is interesting because it represents the opinions of a man who, though he has some knowledge of scientific problems and procedure, is not fundamentally a scientist. Is he entirely correct in assuming that we should do research only in "pure" science, and how would this work out with forestry?

"Throughout the thirteenth and fourteenth centuries experimenting with material things was on the increase, items of knowledge were being won by men, but there was no inter-related advance. The work was done in a detached, furtive, and inglorious manner. ...a considerable amount of private and secretive research was carried on by the alchemists, for whom modern writers are a little too apt with their contempt. These alchemists were in close touch with the glass and metal workers and with the herbalists and medicine makers of the times; they pried into many secrets of nature, but they were obsessed by "practical" ideas; they sought not knowledge, but power; they wanted to find out how to manufacture gold from cheaper materials, how to make men immoral by the elixir of life, and such-like vulgar dreams. Incidentally in their researches they learnt much about poisons, dyes, metallurgy, and the like; they discovered various refractory substances, and worked their way towards clear glass and so to lenses and optical instruments; but as scientific men tell us continually, and as "practical" men still refuse to learn, it is only when knowledge is sought for her own sake that she gives rich and unexpected gifts in any abundance to her servants. The world of today is still much more disposed to spend money on technical research than on pure science. Half the men in scientific laboratories still dream of patents and secret processes. We live today largely in the age of alchemists, for all our sneers at their memory. The "business man" of today still thinks of research as a sort of alchemy."



ENTOMOLOGY

Federal Horticultural Board Activities

From 1920 to and including 1925, American florists had the right to import Narcissus bulbs in any desired quantity in order to give them stock for establishing bulb production in the United States. With the beginning of 1926 all such importations were prohibited, reputable growers assuring the Board that production here is sufficient to supply all home demands. Florists are now, however, permitted to import Narcissus bulbs for propagation, but only after the bulbs have been treated with hot water (under the direction of the Board), which frees them from dangerous bulb insects, and does not injure the vitality of the bulbs. It does, however, render the bulbs unfit for forcing. Heretofore the chief use many florists made of imported bulbs was for the production of cut flowers, and not for establishing home production. The spent bulbs were thrown away after the flowers were cut. But the majority of florists honestly used at least a large quantity of the bulbs imported in establishing home plantations, so that they would be ready to supply the country's needs after the embargo shut off commercial importations at the close of 1925.

Recently, however, the Board uncovered a rather large fraudulent importation by a well-known Holland-American firm of florists, doing business in New York City, who immediately sold to the trade some two million Narcissus bulbs imported in 1926. Legally these bulbs should have been used for propagation, since it is only for this purpose that they can be imported now. As a result of the Board's discovery of this firm's fraudulent transaction, their permits to import Narcissus and other foreign-grown plants are likely to be cancelled. There is chance also that this firm will be further punished by court prosecution.

Extended Range of Blue Spruce

Through the diligence of Mr. E. E. Carter, who was recently scanning a report on a sale prospect of timber in the Datil National Forest, the presence of the Blue Spruce there was recently brought to light. A list of the timbers in the prospect included this species, but so far as our Washington records were concerned we did not know of the existence of the species as far south as that. Mr. Grubb, however, had determined that this species existed on the Datil. In order to be absolutely sure that the tree is found there the writer asked Mr. Grubb, former Supervisor of the Datil, to send specimens of the tree. As he shortly afterward was transferred to the Prescott, our request for specimens was taken up by Mr. F. L. Kirby, who kindly forwarded them, and to our great satisfaction Mr. Grubb's identification of the species proved to be correct

beyond a doubt. In a letter recently received from Mr. Grubb about this matter he stated that the same tree is to be found in considerable quantities on the Gila National Forest, which is another very important extension of the range of Picea pungens. Previously the most southern point at which this spruce had been recorded was in northern New Mexico in the Santa Fe National Forest. The writer has never been on the Datil and Gila National Forests, but it is difficult to understand how so conspicuous a tree as Picea pungens could have been so long overlooked in these Forests. Mr. Grubb's contribution to the range of the tree is very important.

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FOREST EXPERIMENT STATIONS

WASHINGTON

General

Following an extended trip through the West, Messrs. Clapp and Marsh arrived in Washington early in October. After some two weeks in the office, Mr. Clapp left for the Southern Station to attend the Southern Advisory Council meeting. He plans to return to Washington through the Appalachian Station. Chapline returned to Washington the end of October after his extended trip of 5 months, the last place visited being the Southern Station. Sparhawk and Murphy are the only remaining members of the Branch still in the field, and at last reports are somewhere in the wilds of the Lake States. Korstian, who has been in Washington for an extended period, is completing his detail and will return to the Appalachian Station about the middle of November. Reineke made a short trip to the Ouachita Forest to visit the mill scale crew, and from there he went to New Orleans, where he spent a few days at the Southern Station assisting in some statistical analysis, returning by the way of Asheville.

Publications

The manuscript on "Forest Research" is now in galley proof and probably will be published through the Society of American Foresters early in December.

Mensuration

The Section of Forest Measurements is continuing its work on the regional volume table studies for Douglas fir. The western yellow pine regional table has now reached a point where all that remains is the assemblage of the final tables. Possibly this study will be completed by the first of the year. Considerable time was also devoted to the analysis of the southern white cedar data. Korstian's presence in Washington has permitted a recheck of some of the data concerning which there has been question, so that it is now in shape for his forthcoming publication. Additional work was also performed for the western white pine volume and yield table study, and we still have with us more or less continuously the southern pine study on which some rechecking was done.

Some interesting things were brought out in the study of insect damage in the Kaibab Basin, the material furnished being worked up for Dr. Craighead. This work has indicated the possibility of statistical methods in arriving at the important factors in entomological questions as well as in forestry.

The tabulator has been more than busy the entire month, most of the time being devoted to the fire study for the New England States as a part of the cooperative statistical project with the Northeastern Station. Dana spent some little time in Washington on this phase of his work. In addition, some miscellaneous minor work was put through the machines on the study of mensurational technique, and on analysis of permanent sample plot data.

High Temperature Instruments

Korstian visited the Bureau of Standards to discuss the high temperature measuring instruments, especially thermocouples, potentiometers, and galvanometers. He writes:

"For very accurate work in the Laboratory the Leeds & Northrup galvanometer type "K" is very satisfactory. This instrument is not portable and therefore cannot be used in the field. For field use the Leeds & Northrop potentiometer is recommended as the most satisfactory instrument for recording temperatures in forest fires and other similar high temperature work. Mr. H. T. Wensel, of the Bureau of Standards, suggested that it would be desirable to have Leeds & Northrup make some minor changes in their instrument for forestry uses, particularly the incorporation of a cold junction automatic temperature compensator.

The Bureau of Standards very strongly recommends a thermocouple made from chromel (P) vs. alumel wire, made by the Hoskins Manufacturing Company, Detroit, Mich. The wire of these alloys comes in spools of about a pound each and sells for between $4 and $6 a pound for the No. 22 wire which the Bureau of Standards uses.

In making the thermocouples a good thermal junction is essential. This should be secured by twisting the ends of the two wires together and welding with oxygen or acetylene gas. When the junction has been heated to a red to white heat, dip it in borax and then cool in a jet of cold water.

Mr. Wensel suggested that each spool of wire should be calibrated. He volunteered to have this done at the Bureau of Standards if the wire is shipped directly to the Bureau. Mr. Wensel also suggested that it will be desirable to calibrate the potentiometer after purchase, and that they would do this for us and check it up occasionally if brought in when convenient. For the purpose of much of our work, however, after the outfit has once been standardized we can easily check it up to determine the reliability of the standard cell in the potentiometer by comparing it, for example, with a tycosthermometer reading to 700 or 1,000°F." A copy of Bureau of Standards Technological Paper 170, "Pyrometric Practice" is to be sent each station.

Yale Fellowship

The awakening to the need for research may be indicated by the announcement by Yale University of research fellowships in the humanistic studies and the natural sciences. To stimulate scholarship and advanced research in all fields of knowledge, Yale University has announced a series of research fellowships, which will be supported by the income from $1,000,000. These fellowships are open to graduates of approved colleges and universities in the United States and foreign countries who desire to engage in research under the direction of or in affiliation with the graduate faculty of the university. The senior fellowships pay from $1,000 to $2,500 or more per school year, depending upon the character of the proposed investigation and the qualifications of the applicant. The incomes of the junior fellowships range from $1,000 to $1,500. Candidates for the senior fellowships must have a Ph. D. degree or such training and experience in research as are indicated by this degree, while candidates for the junior fellowships must be well advanced in their work toward a Ph. D. degree or possess comparable qualifications. These fellowships are available for work in certain phases of forestry.

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NORTHEASTERN FOREST EXPERIMENT STATION

Dana was in Washington for the greater part of the month, making an analysis of fire statistics for several New England States. A preliminary report on New Hampshire forest fires for the years 1924 and 1925 was completed and forwarded to the State Forester for his biennial report.

Toward the end of the month Behr met Barrows in the field for work on some of the old permanent sample plots at Corbin Park, New Hampshire. A set of thinning plots in even-aged spruce on the west side of the park was located and remeasured. These plots were 45 years old at the time of thinning, and although the data to ascertain the effect of the thinning on growth have not been worked up, the general appearance of the thinned plot is favorable and it is apparent that such dense even-aged stands of spruce may be satisfactorily reproduced by the shelterwood system in which the first cutting is not too heavy.

A series of reproduction plots in the spruce and hardwood and upper spruce slope types on the west side of the park, which had been cut over between 1903 and 1906, were also relocated and remeasured. The entire area cut over in these early years is coming up satisfactorily to spruce, the density and purity of the stand increasing toward the top of the mountain. The advance reproduction which was mostly less than four feet tall at the time of cutting has developed very well and now constitutes in many places almost impenetrable thickets. From the notes it is apparent, however, that the advance growth on this area has been supplemented to a very large extent by seedlings from a crop of cones borne the year prior to the cutting which tallied several hundred per square rod in 1906. Many of the trees are now 3 and 4" in diameter. The old birch and beech left on the area at the time of logging is deteriorating and is not dense enough to seriously hinder the development of the spruce understory. Practically all of the abundant crop of birch seedlings which came up the year following the cutting have died and the new stand will be pure spruce over most of the area. It is to be noted, however, that whenever advance reproduction was lacking and raspberries gained control of the area, reproduction has not been satisfactory.

During the first week of October, Westveld and Spaulding completed the establishment of a series of three permanent slash disposal plots on the Cherry Mountain sale area in the White Mountains. These plots deal with the rate of slash deterioration and the effect of different methods of slash disposal on reproduction. The plots are 3.6 acres in size, and the following methods of disposal will be practiced: (1) Lopping hardwood, and piling and burning softwood slash; (2) no disposal of either soft or hardwood slash; and (3) piling and burning softwood slash, and no disposal of hardwood slash. These plots will also serve the purpose of a logging damage study, an inventory having been made of the reproduction and all larger growth prior to logging.

Westveld also put in considerable time in the Mad River Valley, New Hampshire, relocating and remeasuring a series of methods of cutting plots which had been established by the Forest Service in 1906. These plots form a valuable supplement to the increment study on cut-over spruce and fir lands. He also looked over the Johnson Brook chance, which has been advertised for sale, to determine its suitability for the establishment of permanent sample plots. This chance supports one of the best stands of old growth hardwoods in the Northeast.

Gast's studies in light measurements at the Harvard Forest, in which thermopiles, photoelectric cell, and "Urox" (Uranium sulphate) solutions were used, were conducted in two kinds of site — one open site, and the other a two-story white pine-hemlock stand, which formed a good basis for comparison. A check was also made of the results of the previous summer's investigations, during which a different type of thermopile was used in three areas of a shelterwood cutting of oldfield pine: the first opened by a removal cutting; the second, after a preparatory cutting; and the third, oldfield pine thinned sixteen years ago. The effect of spots of direct sunlight on the forest floor was disclosed. The "blue" light, measured by a photoelectric cell, relatively greatly increased by direct sunlight, while the "red" portion of the spectrum, measured by the thermopile, was relatively little enhanced.

Gast and Stickel, with the assistance of Mrs. Gast, prepared a translation of the German summary of the latest Swedish Research Institute publication, an article by Dr. Hesselman entitled "Studies of the Humus Layers of Coniferous Forests, their Peculiarities, and their Dependence upon Silviculture." This article emphasizes the significance of nitrogen in the nutrition of the forest, shows the interrelations of buffer action to hydrogen ion concentration, which are dependent upon the species origin of litter (oak leaves, spruce needles, etc.), and the lime-rich or lime-poor character of the soil. These factors determine the rate of decomposition of the litter, and the availability of nitrogen. This translation consists of 50 closely typewritten pages, and will be mimeographed if there is sufficient demand to warrant it.

Field work on the fire weather study at the Harvard Forest was discontinued at the end of the month. On account of the comparatively wet fall, Stickel had an opportunity to try out the Zeleny electric moisture meter. It was hoped that this instrument would enable us to do away with the duff hygrometer, but it is not believed that the instrument with its present construction is suitable for obtaining moisture percentages of duff or wood when the moisture falls below 10 per cent. Further experiments will be made with this instrument to determine whether temperature has any effect on its accuracy.

In addition to the slash disposal work at Cherry Mountain, in the White Mountains, Spaulding put in considerable time on white pine slash disposal at Alfred, Maine, and in mixed slash at Sugar Island, Maine, and at Ferdinand, Bolton, and Stowe, Vermont.

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LAKE STATES FOREST EXPERIMENT STATION

Good progress was made during October at the Upper Peninsula center of work. The compilation of the estimate of the standing timber shows 3,157 M board feet on the 300 acres, or a little less than 10 M board feet to the acre. Of this sugar maple makes up 73 per cent, yellow birch 13 per cent, northern white cedar 8 per cent, and white and black spruce, black ash, balsam, red maple, hemlock, and white pine the balance.

Arrangements have been made for the first year's cutting of 20 acres on this area. One-third of the basal area, or a little over 3 M board feet to the acre will be cut. Only logs which are 12 inches or larger at the top are to be cut. Most of them will be veneer and pin logs which bring $10 to $11 per M more than the average run of logs. The logging has been let to a local farmer who will cut, haul, and load the timber at $10.50 per M, several dollars less than the usual logging cost in the region. The tops and defective logs will be cut into cordwood for chemical use to a 3-inch top diameter. The cost of this part of the operation will be $4 a cord, a figure which is again lower than the average in the region. The close utilization, together with the small number, 5 or 6 trees per acre, which will be cut, is expected to eliminate the problem of slash disposal. The marking corresponded somewhat to a flexible diameter limit of 22 inches d.b.h. Most of the larger trees are to be cut and the smaller ones only when their silvicultural condition requires it.

Wackerman will stay at the Upper Michigan center until the cutting of the timber is completed. He will make measurements as cutting progresses for the preparation of local volume tables and obtain some stem analyses to indicate the rate of growth of the old growth timber. The whole tract has dense reproduction of sugar maple so that the regeneration of the stand is already taken care of. A separate account of the expense and revenue from the logging on this tract will be kept by the Cleveland Cliffs Iron Company.

The University of Minnesota Technical Bulletin, Number 39, "Tables for Determining the Contents of Standing Timber in Minnesota, Michigan, and Wisconsin," came from the printer during the month and is being widely distributed in the three States. This bulletin is a joint compilation by the Cloquet and Lake States Forest Experiment Stations, in which Brown took an active part. It contains the new jack pine and aspen tables prepared by this station, and also several others which have not previously been published.

Iron and Gogebic counties in extreme northwestern Michigan have recently become much interested in the subject of County Forests, primarily perhaps because of their realization of the importance and necessity of preserving the scenic values along the highways. As a result of

this interest, Zon was invited and gave two talks in Iron County, one before the Lions' Club at Iron River and one at Crystal Falls. He outlined a policy for the development of County Forests which the Iron County Road Commission is now considering.

The intensive campaign in Minnesota to create sentiment favorable to the constitutional amendment to permit modification of the method of taxing forest land, has called for some time on the part of the members of the Experiment Station.

Toward the end of the month Zon and Kittredge joined Assistant District Forester Thompson on the Superior National Forest and, after an attempt to size up the important problems in need of study on that Forest, an area was selected for the establishment of permanent sample plots to try out methods of cutting in the predominating polewood stands of jack pine. Four one-half acre plots were laid out. One was left as a control, one was marked to remove in the dominant and suppressed crown classes all trees which should come out for commercial or silvicultural reasons. This resulted in a 66 per cent removal by basal area. A third will be cut to a 6-inch diameter limit without regard to silvicultural considerations. Such a cutting will remove only 48 per cent of the basal area. The fourth was marked with the idea of a thinning in the suppressed and intermediate crown classes, leaving most of the dominant trees for increased growth. This resulted in a 57 per cent of basal area removal. The slash on half of each plot will be lopped and on the other half burned currently or piled in small piles and burned. Reproduction strips will be laid out and counted after the cutting is done. The local forest officers hope to arrange for the cutting before next spring so that the establishment of the plots may be completed before growth starts.

Mitchell attended and addressed a meeting arranged by the Extension Division at Faribault to emphasize the place of forestry in the farm woodlot to the local people.

The anniversary of the Cloquet fire was celebrated at Cloquet on October 12 by a gathering of representatives from the region, including United States Senator Shipstead. Zon attended this meeting.

Visitors at the station during the month included Donald Bruce, M. W. Thompson of District 2, F. G. Wilson, Extension Forester of Wisconsin, Dr. Carl Hartley of the Office of Forest Pathology, George Banzhaf of the firm of Banzhaf & Watson, Consulting Foresters, A. L. Nelson of the Colorado National Forest, and J. R. Lloyd of the Weather Bureau, who had closed the fall fire season in Minnesota and was on his way to his headquarters at St. Joseph, Missouri.

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APPALACHIAN FOREST EXPERIMENT STATION

General

During October the Station's mailing list was increased by about 300 names as a result of the postal card canvass. These names are now being put on addressograph plates at Washington. The Station proposes to mimeograph and distribute information on its current work at frequent intervals.

Frothingham attended the meeting of the Appalachian Logging Congress at Cincinnati and discussed the work of the Station, emphasizing better cooperation with the Logging Congress. The desirability of starting a mill scale project in Southern Appalachian hardwoods was also brought before the Congress. Although this was the subject of a strong paper by W. W. Ashe, considerable doubt was expressed as to whether such a study could be managed at this time. Incidentally, the Appalachian Logging Congress was re-organized at this meeting under the name of the Appalachian Hardwood Club, with headquarters at Cincinnati.

From Cincinnati Frothingham went to Washington, where he spent several days at the Washington office and attended the meeting of the Association of State Foresters which was held in Washington.

Collection of Tree Seed

Taking advantage of the good seed year for red spruce and southern balsam fir, a field party consisting of Hursh, Buell, and Sims spent a week in the Black Mountains of North Carolina gathering cones of these species. Fir cones were collected in the Mount Mitchell State Park near the summit of Mount Mitchell at an altitude of above 6,000 feet. The cones were in excellent condition for gathering, being mature but not yet beginning to shatter. Spruce cones were gathered from trees in the vicinity of Toe River Gap, Mount Mitchell Section of the Pisgah National Forest, at an altitude of about 5,000 feet. With the spruce considerable variation was observed in the stage of maturity, size, and abundance of the cones on different trees. Large trees bearing medium sized mature cones were selected for harvesting. All the cones were hand picked from standing trees or, as was found to be convenient in some cases, the tips of the upper fruiting branches were clipped and allowed to fall to the ground, where the cones might more easily be removed from the cluster. All the cones gathered were sun dried in drying frames at the Bent Creek Field Laboratory where the seed was extracted and cleaned. Approximately 2.2 pounds of clean seed was secured per bushel of dry cones in the case of fir, and about one pound per bushel of dry cones for the spruce. Forty pounds of clean fir seed and twelve pounds of spruce seed were obtained.

The party also collected fruits of yellow poplar from freshly felled trees on Bradley Creek, Pisgah National Forest. The trees were bearing heavily and the fruits were of good size and quality, giving an average of about 25 per cent of sound fruitlets. The seed was dried in frames partly protected from the sun at the Bent Creek Station. About fifty pounds of dry seed was secured.

A small amount of seed of Canadian hemlock, Carolina hemlock, and mountain magnolia has also been collected. Acorns were relatively scarce and only small amounts of the more important species were collected. No seed was collected from either shortleaf or pitch pine, as 1926 was apparently a very poor seed year for these species in the vicinity of the Bent Creek Station.

Stratification beds are being prepared at the Bent Creek Station for storing the collected seed over winter.

Slash Disintegration Study - Cooperation with District 7

McCarthy and Sims worked in cooperation with Ranger C. L. Fink, of the Pisgah Forest and Dr. George G. Hedgcock of Plant Industry, on a study of slash decay on the Pisgah timber sales. This work was in the nature of a reconnaissance of this problem. Timber sale areas from 4 to 13 years old were examined. Some of the areas had been cut under Forest Service supervision and some were cut under the earlier contract of the Carr Lumber Company. In the latter case no disposition was made of the tops.

Decay in the sapwood of the hardwood species observed begins in the first year of the cutting and is usually completed in four to six years. Inflammability of the slash in this stage depends on the degree to which it is exposed to drying. The shade of trees left in the logging and of new growth helps to keep the spongy, decayed wood saturated. In this decayed condition the sapwood dries out slowly.

Some species, such as chestnut and the oaks, decay very little in the heartwood until the sap has fallen away. This leaves comparatively small branches of dry heartwood exposed as a fire hazard for ten to fifteen years after a logging operation. If lopped so that these come in contact with the ground, they decay more rapidly.

The most significant fact brought out in the work was the distinctive character of heartwood and sapwood decay, caused usually by different species of fungi, and the long delayed infection of slash by heart-rotting fungi, regardless of the dampness of the place where the slash was found.

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SOUTHERN FOREST EXPERIMENT STATION

General

The two additional student assistants who joined the Station staff in the middle of October have each had the benefit of experience with other experiment stations, Mr. E. W. Gemmer having spent two seasons working for or in cooperation with the Northeastern Station, while Mr. L. A. Sanders comes directly from an assignment with the Pacific Northwest Station.

Edgar Alan Smith, a Junior Forester assigned to the Florida National Forest to work practically under our direction, died while in swimming at Camp Pinchot on the 25th. Wakeley and Wyman, in full woods costume, including heavy boots, swam immediately to the rescue on seeing Smith suddenly disappear in ten feet of water. Wakeley succeeded on the second attempt in getting the limp body to the surface, and with the help of Wyman and other Forest officers brought it ashore. There persistent efforts of almost an hour by not only the Forest Service men but by a doctor failed to revive Smith. It seems likely from the state of the dead man's lungs and other conditions that a failure of the heart, rather than drowning, was the immediate cause of death. The tragedy is deepened by the splendid promise and winning personality of Mr. Smith. A brief career in forestry had won for him the admiration of all who knew him.

The third meeting of the Southern Forest Research Advisory Council was made a two-day affair this year and held at the Bogalusa Branch Station on October 26 and 27. Six members of the Council attended and three others sent personal representatives; Messrs. Clapp and Chapline of the Washington office were present, and Mr. S. W. Greene of the Coastal Plain Experiment Station at McNeill, Mississippi, also attended. Those present spoke very enthusiastically of this meeting, which combined the regular business session with a well planned itinerary to several of the Station's experimental plots, the Great Southern Lumber Company's nursery, plantations, and paper mill. The value of demonstrating the work of the Station in the field seemed to fully justify the attempt to hold this meeting outside of New Orleans. The Council approved the Station's program for the coming year, as presented by Forbes. A resolution was passed endorsing the Fletcher Bill, which would provide for a considerable addition of funds available for naval stores research, and a second resolution recommending that additional appropriations be made to cover a program of research in the Southern hardwoods comparable to that which is now being carried out for pines.

Following the Council meeting, Mr. Clapp spent a few days at the New Orleans office going over in detail the program of the Station work, and at the end of the month, in company with Forbes, joined Wyman and Wakeley on the Florida Forest. There general consideration was given to the proposed plans for comprehensive studies of natural reproduction and fire. These are to be carried out in cooperation with D-7, as soon as a successor to Junior Forester Smith can be found.

Mr. Reineke stopped over in New Orleans for a couple of days on his return trip to Washington to assist Wakeley in working out the application of statistical methods to the forestation data, and Forbes in a review of Hadley's manuscript on seedling mortality of longleaf pine at McNeill. Reineke at this time also reviewed with the Station staff the method of site determination tried out during the extensive survey trip into southern Georgia and northern Florida and which had recently been worked up by Demmon.

Management

Wyman spent the greater part of October on the Choctawhatchee Division of the Florida Forest and was joined about the middle of the month by Wakeley. They reexamined the permanent reproduction plots (Mc-112) there and also assisted B. H. Paul in the initiation of a project for a study of the effect of irrigation and fertilizing on the growth of longleaf pine.

Barrett reports that besides handling the routine work of obtaining data on felling, skidding, loading, and hauling for the mill scale study now under way on the Ouachita National Forest, he has found time to make site determination for shortleaf pine growing under various conditions, has assisted in running strip surveys in cut-over areas to determine extent of fire scarring and amount of timber removed, has helped out with scaling in the woods, and has obtained considerable data on the loss caused by cutting trees into wrong lengths for maximum utilization.

A summary of private forestry practice in the South was compiled by Demmon for the American Forestry Association. The fact that the list prepared included information on twenty-one lumber companies in this region, each of which is actually practicing some phase of forestry, indicates the general awakening interest in forestry which has taken place here within the last few years.

Forestation

Wakeley analyzed the data on seedling survival which Professor Hayes recently gathered for the Station, and a few preliminary comparisons of interest are as follows: Two-year-old plantations of slash pine showed a survival of 69 per cent on slopes compared to 76 per cent on the flats where it naturally grows. One-year-old slash pine plantings showed an average growth during the 1926 season of 18 inches on ridges compared with 23 inches on flats. One-year-old slash plantations had a survival of 78 per cent on flats, 70 per cent on slopes, and 61 per cent on ridges. Rabbit damage was serious on the ridges and slopes but slight on the flats. Longleaf and slash one-year-old seedlings growing on a natural longleaf ridge-top site gave survival percentages of 73 for slash and 86 for longleaf, with some rabbit damage, confined only to the slash seedlings. On a similar area longleaf showed a survival of 88 to 62 per cent for slash. These preliminary figures indicate that there may be considerable danger in attempting to plant tree species out of their natural habitat.

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CALIFORNIA FOREST EXPERIMENT STATION

The Station is finally located in the new quarters on the campus of the University of California on the first floor of Hilgard Hall. Four large office rooms have been placed at our disposal, together with storage space for field equipment and supplies. The details of becoming settled are now well in hand. The offices are very comfortable and well lighted. We are gradually becoming accustomed to the peaceful quietude of the campus, and should accomplish much this winter toward catching up with our badly disrupted program. Kotok's time is being very fully occupied with organization work.

A short trip to Los Angeles was made to discuss cooperation in the southern California work with several interested parties and to interview candidates for the nursery job. The urgency of getting some work under way in the South and the failure to find a suitable man to place in charge of this project will make it necessary for some member of the present staff to go to southern California for the preliminary organization work.

Kotok is now on the Shasta assisting in experimental fire-line construction with heavy machinery in the brush fields. A specially armored tractor and heavy scraper are being tried out.

A considerable amount of Kotok's time is being taken up in preparation for the board of fire review and in preparation for the course in fire protection he is to give at the Feather River training school the first part of November.

Work on completion of the type map of the State is now well under way. The long belt of foothill brush and woodland outside the national forests, the national parks, parts of the redwood region and north coast ranges, and the southern California protection forests must be covered. Wieslander and Siggins are now working along the fronts of the Eldorado and Tahoe. They are being assisted by the local State rangers through courtesy of the State Forester. Dunning spent a short time in the field to assist in harmonizing our ideas as to the classification of types. One great difficulty being encountered is the absence of suitable base maps. The forest maps do not cover much of the territory and are very inaccurate, besides showing no topography. The Geological Survey sheets are mostly very old and frequently inaccurate. Most of the county maps are of little value. To cover the large area within the limits of time and funds it is necessary to follow the method of extensive sketching by traversing roads and viewing from elevated points that can be located on the maps.

Dunning spent several days in preparation of subject matter for the Feather River training school. Three days were spent at the school. Lectures were given on the scope and application of silvicultural research in connection with the management course. He assisted Mr. Woodbury in some sample marking and field demonstration.

While on the Plumas, Dunning assisted Mr. Fair and Supervisor Rogers in making some panoramic photographs from two of the lookouts to determine the photographic technique and the possibilities of such pictures for use in fire detection. Three days were spent with Mr. Fair in securing some illustrations for the proposed tree-class publications.

Professor C. F. Shaw of the Division of Soil Technology visited the Station to consult with Mr. Kotok as to the possibility of extending soil surveys to forest land. Dr. L. F. Hawley spent some time with Kotok in connection with his study of the laws of combustion.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Practically all field work for the season was brought to a close during October. Munger, McArdle and Meyer have been in the office most of the month, and a good start made on the big winter jobs.

Four permanent sample plots in the Olympic Forest were laid out by Meyer, and this brings the total number of permanent growth study plots in Douglas fir up to eighteen. A part of Meyer's winter work will be the computation of the measurements obtained on these plots and the revision of former measurements on some of the other plots. Most of McArdle's month was spent on the Douglas fir yield study computations and a preliminary report giving a few of the tables was prepared for distribution to foresters who are most urgently in need of this information. The determination of moisture content of various forest fuels, and the analysis of smoking hazard occupied most of Simson's time during the month. Westveld finished up seven months of field work and returned to Portland at the end of October to begin analyzing the large amount of data he has obtained. Isaac also completed his field work, making during the month the periodic examinations of the seed catcher, the various Douglas fir reproduction study plots, and established five new groups of plots to be used next year in a very intensive phase of the regeneration studies.

Since the altitude of the Douglas fir spacing test plantations at Wind River almost precludes the possibility of spring planting until after the summer drought has set in, it was decided this year to try out fall planting in replacing those trees which have died. These test plantations are on a rather severely burned area, and in many places the humus has been entirely consumed, leaving the soil in a loose, ashy condition. The greatest mortality was found on these spots of excessively heavy burns and goes to show how important humus is in conserving the moisture necessary for tree establishment and growth.

A shipment of locust sprouts was made to the Long-Bell Lumber Company at Ryderwood where it is planned to use them in establishing an experimental firebreak. Opinion seems to be divided just now as to the effectiveness of hardwood firebreaks in this region; some worth while results may be forthcoming soon from several such experiments now under way.

A tract of seven forties of virgin Douglas fir forest on the Columbia Forest has been set aside by the District Forester as an experimental area, to be permanently kept in primeval condition. The area lies close to the Wind River Station and Nursery and will be useful as a sort of laboratory to study the rate of growth and deterioration of old stands, the forest succession, the fire hazard, and other physical factors in comparison to the conditions in young stands or on cut-over lands. As

virgin stands become scarcer this accessible area will be increasingly interesting to visitors and serve as a forest museum. A news note about this reservation took well in the papers. The Eugene Register had an editorial about it, ending up by saying "But 280 acres is a small segregation for laboratory purposes. A half-dozen sections would have been little enough."

Mr. Lloyd Austin of the Eddy Tree Breeding Station was a caller during the month. With his two assistants he spent a day at Wind River selecting from the nursery beds trees that showed promise of exceptional vigor. Mr. C. S. Judd, Superintendent of Forestry in Hawaii, was also here and went with Munger to Wind River for a day. The Director has written an article on "Snags," a few short news items, and a circular letter to each member of the Advisory Council giving a statement of the activities of the Station during the past season. He has devoted some time as a member of the Forest Taxation Committee of the Portland Chamber of Commerce which has been considering the measures proposed for Oregon.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The field work of establishing permanent methods-of-cutting plots in the western white pine type was brought to a close October 15. With the help of Marshall and four field assistants, Weidman was engaged on this work for five weeks this fall. Rain interrupted the work to some extent. Three plots were established on the West Branch of Priest River, within an hour's run by car from the Priest River Station. These plots are 1, 2, and 10 acres in size, and contain altogether 140 reproduction quadrats of mil-acre size. The seed trees and all residual trees were tagged, measured, and described. These will be remeasured at 5 or 10-year intervals, but their seed production will be observed annually. The reproduction quadrats were mapped and described for soil, humus, duff, and ground cover. Subsequent reproduction will be marked with individual wire stakes at each autumn examination and the record of germination, loss and establishment will be kept in relation to seed crops.

In connection with the permanent reproduction quadrats, the matter of shade was handled somewhat differently from the conventional method. In cutting in the western white pine type there are often considerable residual trees in addition to white pine seed trees, such as cedar, hemlock, and white fir. There are thus all degrees of shade from none to about 0.7 shade. To project the periphery of crowns of trees vertically to the ground and take that as the shade received by a quadrat (as is sometimes done in work of this sort) would be misleading and without value. To give a more nearly correct measure of the light and shade received by each reproduction quadrat, an estimate was made of the light actually reaching the ground during an average day of the growing season, including both diffused light and direct sunlight. In doing this, consideration was given to the general openness of the cut-over canopy and also to the amount of space occupied by open sky and tree tops along an arc representing the path of the sun in summer. The result was then expressed in terms of shade; for example, "the quadrat receives 0.4 shade." In addition to this it is planned next summer to measure instrumentally the actual sunlight received on several of the quadrats.

During the latter half of October, Gisborne, Marshall, and the four field assistants were concentrated at the Priest River Branch. During this period the following permanent plots were established on the experimental forest: 1 larch yield plot; 1 Douglas fir yield plot; 2 pruning plots in 40-year-old white pine; virgin timber plot of 125 acres; 50 reproduction quadrats in the Experiment Station burn. In addition to this, the 20 miles of trails and roads in the forest were traversed and marked for posting at half-mile points. Weidman remained at the station until October 21 to get this work started. The crew will be retained at the station through the first week of November to finish odd jobs.

The idea of the pruning plots is to determine whether it will be practicable and worth while in the future to remove live and dead branches up to 17 or 18 feet above ground for the purpose of producing clear butt logs. Western white pine retains dead branches along butt logs up to 80 and 100 years, depending on density and other conditions. By 40 or 50 years of age most of the branches on butt logs are dead. With the virgin timber gone and a rotation of about 100 years, there will be very little clear white pine lumber, unless pruning is resorted to. On the tenth-acre pruned plot, which has just been established, it is believed that 25 dominant and co-dominant trees will come through to rotation age. The cost of pruning dominant and co-dominant trees was kept separate from the cost of pruning intermediate and suppressed trees. In practice, the latter classes would most likely not be pruned. The check plot parallels the pruned plot in position and density and has an approximately similar number of dominant and co-dominant trees to come through to rotation age. Both plots will serve as yield plots representing stands of somewhat less than normal stocking. When the timber on these plots is ready for cutting, it is planned to make a mill study of grades sawed from the pruned and unpruned trees. It is reasonable to believe that there will be a higher mill run in grades from the pruned than the unpruned plot. With a diminishing of select grades as virgin timber disappears, it would seem that pruning should prove a paying practice under intensive timber growing of the future.

Haig brought the field work on the white pine yield study to a close and returned to Missoula October 15. Nine normal yield plots were taken this month and various other data accessory to the yield study were gathered. Altogether a total of 96 normal plots were taken this summer which, together with the plots taken in previous seasons, brings the total to about 325 plots.

As an incident of the field work during the summer, Haig took three sets of plots to get an idea of the influence of density of stocking on height growth. Preliminary figures have been worked up and although the data are not sufficient to draw conclusions, they give very interesting information of what is to be looked for. This little study was made by taking a pair of plots in each of three different localities; the paired plots being contiguous in position and of exactly the same age and site, but of different density of stocking. The difference in stocking was not due to accident but obviously had prevailed in each stand since its establishment. The following table shows very definitely the greater height of the trees in the dense stands as compared with those of the more open stands in each set of plots.

Set of Plots	D.b.h. Classes in Inches	Total Height in Feet (western white pine only)		Difference in Ht.	
		Dense Plot	Open Plot	Feet	Ave. Per Cent
		8,010 stems per A.	5,940 stems per A.		
A 35-40 Yrs.	1	9.5	8.5	1.0	9.4
	2	14.0	12.5	1.5	
	3	17.0	12.5	1.5	
	4	19.5	18.0	1.5	
		5,620 stems per A.	2,980 stems per A.		
B 35-40 Yrs.	1	10	9	1	8.7
	2	17	15	2	
	3	22	20	2	
	4	25	24	1	
		817 stems per A.	603 stems per A.		
C 75-80 Yrs.	5	42	38	4	8.5
	6	53	45	8	
	7	60	52	8	
	8	66	58	8	
	9	72	64	8	
	10	77	69	8	
	11	82	74	8	
	12	85	78	7	
	13	88	83	5	
	14	90	86	4	
	15	92	90	2	

The height figures given are from carefully balanced curves based on an adequate number of actual measurements. Actually the trees in the dense stocking on the three pairs of plots are 8.5, 8.7, and 9.4 per cent taller than the trees of the more open stocking. This indicates that difference in height due to density on the same site may be found marked enough to cause inconsistencies in determining site quality of stands of various stocking found in Nature. If this proves to be so, there will be still another difficulty in applying normal yield tables. The yield tables, of course, will be based on the height attained in fully stocked stands, whereas their application will be to the average run of stands which are of far more open stocking.

During October Wahlenberg field planted 4,000 trees in connection with existing experiments. Of these 1,400 were white pine and 1,400 yellow pine for a test of field survival following seven different nursery treatments involving control of moisture supply. This is the so-called "hardening-off" experiment in which the attempt is being made to prepare planting stock for the field by checking its growth during its last season in the nursery and promoting the storage of plant food in the tissues. It is hoped that this will result in more rapid root penetration after planting and hence higher survival in the field.

The other 1,200 trees were six lots of yellow pine having root systems modified by fertilizing in layers. Survival records on these trees are needed in order to check the indications as to the relative value of the modifications attained.

Throughout the month laboratory work has been in progress on trees from some 95 plots in fertilizer experiments. This work will extend into November. As the drying over here is inadequate for the purpose, an attempt is being made to obtain the use of the larger electric oven at the Forest School of the University of Montana. Field examinations of plantations were made this month and more such work will be done in November if the weather permits.

On October 14 and 15, Mr. Merriam, representing the firm of Mason & Stevens, visited both the Missoula office and the nursery. He was primarily interested in methods of culture for yellow pine in anticipation of establishing a nursery for his firm for growing Jeffrey pine in California. In the office he obtained white pine growth and yield data.

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ROCKY MOUNTAIN FOREST EXPERIMENT STATION

October Activities

After days spent in scouting for a competent and reliable man to take the place of Ranger Robertson, Arthur Rambo was drafted into the service October 18, he having been employed as a guard on the Pike until the 15th. He was immediately put to work hauling the winter's supplies into the Station, including more than a ton of sand from Nebraska.

Owing to delay in filling this position, and more recently to sickness of Bates, the plan for starting the T-5 tests has lagged considerably behind schedule, but it is hoped everything may be under way by November 15, if Bates is soon able to resume field work.

Aside from this one project the field activities have been of extremely routine character, mostly odd jobs in finishing up the season's work and in preparations for the winter. Roeser has, however, spent several days on mapping plots in the M-1 study.

After a few more days spent at the Station both Roeser and Bates will be almost steadily in the Colorado Springs office, preparing a report on the most recent tolerance test, working on a spruce volume table, and summarizing projects for the District Investigative Committee meeting which will be held this year about December 15. Bates is scheduled for a talk November 1 before the Colorado Research Club in Denver, where botanical and silvical characters of Colorado conifers will be principally dealt with. The Office of Public Relations in the District is making rather definite plans to bring the Experiment Station work more forcibly to the attention of the public, partly, at least, through Forest Officers throughout the District.

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Pearson and MacIntyre of the Coconino spent several days together examining cut-over areas, with particular reference to brush disposal and reproduction. It is gratifying to observe that thousands of acres of old cutting have escaped fire and are now approaching a stage where the slash no longer constitutes a great hazard. An excellent stand of seedlings evidently started on extensive areas in the region south and east of Rogers Lake about 1892. Where this has been preserved we now have a veritable jungle of reproduction on Forest Service and private cuttings alike. Where this and subsequent reproduction has been destroyed by grazing, from 60 to 95 per cent of the land lies idle and in many places the soil is deteriorating through erosion. It cannot be too strongly emphasized that the big unsolved problem on the Colorado Plateau is not brush disposal, nor marking, nor fire, but grazing.

In the last week of the month, Pearson visited the Jornado Range Reserve and the Douglas fir sample plots at Cloudcroft, New Mexico. Anyone who has the impression that grass won't grow on the "desert" of New Mexico and Arizona should visit the Jornado and the Santa Rita Range Reserves.

The Douglas fir cutting plots near Cloudcroft on the Lincoln continue to be pursued by ill fortune. In the fall of 1924 the plots representing heavy selection and light selection methods of cutting were partially burned over by a slash fire. Last winter these same plots were swept by a tornado which blew down practically every tree above 4 inches d.b.h. on all but about 10 per cent of the area. None of the other three cutting plots were disturbed.

Douglas fir seedlings on the Lincoln are as elusive as their yellow pine cousins on the Coconino. Forest Service cuttings dating back to 1921 have made little progress toward restocking. In the summer of 1924, 15 plots of 100 square feet each were laid out in 5 methods of cutting, viz., scattered seed tree, diameter limit, heavy selection, light selection, and shelterwood. On 13 of these plots (eliminating 2 that were burned) the following seedlings of 1924 germination were counted in October of that year: Douglas fir 231, white fir 16, blue spruce, 46, yellow pine 2. In October 1926, the following remained: Douglas fir 24, white fir 5, blue spruce 5, yellow pine 0. The difference between different methods of cutting are not sufficient to warrant drawing conclusions as to their relative merits. Examinations early in the spring of 1925 showed that most of the loss was due to exposure during the open winter of 1924-25.

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Status of Manuscripts Received

Northeastern

"A Method for the Preparation of Local Yield Tables," J. A. Amilon. (Rev. by C. E. Behre for Jour. For.)

Appalachian

"Natural Replacement of Chestnut," C. F. Korstian and P. W. Stickle. (Ms to Dept. for Dept. Circular.)

Southern

"A Form of Contract for Turpentine Leases." Lenthall Wyman (For Yearbook)

"Chipping Pines for the Highest Yield of Turpentine." Lenthall Wyman. (For Yearbook)

Pacific Northwest

"Snags." T. T. Munger and George L. Drake. (For Lumber Trade Journals.)

Advance Sheets of Some Tables Resulting from a Yield Study of Douglas Fir in Western Oregon and Washington. R. E. McArdle.

In Print

Committee on Growth and Yield - Methods of Preparing Volume and Yield Tables. Report of Committee on Standardization of Volume and Yield Tables. (Jour. For. Oct. 1926.)

Bates, C. G. The Determination of Increment in Cut-over Stands of Western Yellow Pine in Arizona. (Rev. of Herman Krauch - Jour. Agric. Res. Vol. XXXII, No. 6, Mar. 15, 1926.)

Dana, S. T. The Mission of Forest Research. (Jour. For. Oct. 1926.)

Gisborne, H. T. Lightning and Forest Fires in Northern Rocky Mt. Region. (Mo. Wea. Rev. July, 1926.)

Roeser, J., Jr. Rev. of "Forest Tree Seed Grading," by M. Kienitz. (Zeitschr. Forst. -u Jagdw. 56, 1924.)

Roeser, J., Jr. Rev. of "The Care of the Growing Stock in the Saxon and Prussian State Forests," by R. Hausendorf. (Zeitschr. Forst.- u Jagdw. 56, 1924.)

Simson, A. Gael. Studying the Causes of Forest Fires. The Esterline-Angus Co. Bul. 926. Indianapolis.

Spaulding, Perley. Bibliography on Slash Pine Disposal. (Mimeographed)

" " The White Pine Blister Rust in Germany. (Jour. For. Oct. 1926.)

Wahlenberg, W. G. Age Classes of Western White Pine Planting Stock in Relation to Aspect of Planting Site in Northern Idaho. (J.A.R. Oct. 1, 1926.)

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FOREST PRODUCTS - WASHINGTON OFFICE

Cooperation - National Lumber Manufacturers Association

The chart entitled "Nearest Comparable Grades of Yard Lumber Cut from Various Species of Softwoods" was revised and lithographed. The new issue was distributed to all lumber manufacturing associations, lumber trade journals, and various purchasing agents of the United States Government. Numerous requests have been received from private individuals, lumbermen, and others for a copy. This chart will be attached to and made a part of the United States Master Specification for Lumber to be issued in the near future by the Federal Specifications Board.

Cooperation-Federal Specifications Board

A meeting of the Technical Committee on Lumber of the Federal Specifications Board was held on October 29, at which a dozen men from as many different branches of the Government were in attendance. Tentative master specifications for the use of the United States Government were laid before the Committee by Mr. Betts, the chairman. After some discussion they were adopted as presented with a few minor modifications. The specifications provide mainly that softwood lumber, including yard lumber and factory or shop lumber, purchased by the Federal Government be bought under the current grading rules of the various lumber associations where such grading rules are approved by the Central Committee on Lumber Standards as in conformance with American Lumber Standards.

The chart entitled "Nearest Comparable Grades of Yard Lumber Cut from Various Species of Softwoods," prepared by the Forest Service in cooperation with the National Lumber Manufacturers Association forms a part of the report of the Committee.

Miscellaneous

Mr. John B. Cuno left Washington the last day of the month for Madison, Wis., his new official station, to become a member of the Forest Products Laboratory staff.

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FOREST PRODUCTS - DISTRICT 1.

Montana Forest and Timber Handbook

Authorization for the publication of this handbook by the University of Montana Forest School was given by the State Board of Examiners. A number of minor corrections have been made in the manuscript before going to press to bring to date recent changes in the personnel of Forest agencies and add new names in the list of State directories. New overrun figures have also been substituted for those originally indicated for the commercially important species. An edition of about 3,700 copies is being planned and these should be available for distribution in the very near future.

Lumber Prices and Movement

	1925	1926		
	Annual	First Q.	Second Q.	September
Idaho White Pine	$37.37	$37.10	$38.65	$36.89
W. Yellow Pine	28.02	29.33	28.14	24.91
Larch-Fir	19.33	19.33	18.05	16.87
White Fir	20.14	19.79	19.86	18.60
Spruce	24.28	23.60	25.68	21.26

	1925	1926
Cut	181,869 M	159,033 M
Shipments	158,611 M	176,788 M

The Air Seasoning of Western Softwood Lumber

Mr. S. V. Fullaway spent the major portion of the month of October in District VI, making a personal inspection of the air seasoning conditions and practices in the Coast fir region. The trip is being made in preparation for the assembling of the air seasoning data for the three regions in a departmental bulletin covering the air seasoning of western softwood lumber. Results of the air seasoning studies in Districts I, V, and VI have been or are being published as trade journal articles.

Mr. Fullaway plans on spending a like amount of time in study among the mills of the California pine and redwood regions before returning to this office.

Standardization - The Thickness Question

Mr. E. M. Davis of the Section of Industrial Investigations, Forest Products Laboratory, spent three weeks during October in this District. Mr. Davis was interested mainly in certain phases of the standardization problem, with special reference to the thickness question. First-hand information was acquired on the effect of manufacturing conditions and degree of utilization at the mills upon various thickness standards.

Ten mills and several secondary wood-using industries were visited during Mr. Davis's stay in District 1. Upwards of twenty-two hundred wood samples were collected and shipped back to the Laboratory to be used in tests of moisture contents, shrinkage, specific gravity and density. The timber species included in the wood samples were western white and western yellow pines, western larch, Douglas fir, white fir and hemlock.

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FOREST PRODUCTS, DISTRICT 5

White Fir

On this study, trips were made by Mr. Brundage to the San Joaquin and Sacramento valleys, visiting both sawmills and retail yards, as well as contractors and other local users. In the former region the tendency towards obtaining fuller advantage of the possibilities of the higher grade portion of the white fir product, by more careful manufacture and by turning this higher grade material into interior finish, etc., which has been observed for the past year, is becoming more pronounced. The extent to which white fir is giving satisfactory service, and the prejudice of lumber users in the San Joaquin valley against white fir being overcome, is indicated by the case of a Fresno contractor who is building a $22,000 house for his own occupancy and who is using white fir in preference to Douglas for the entire framing structure, from studding to rafters and joists. The latter he is spacing somewhat closer than the standard for Douglas fir.

In the Sacramento valley, as was suspected, very little white fir is to be found in retail yards. The prejudice against the species has not been overcome. Douglas fir from Oregon can be laid down so much cheaper than white fir in the Sacramento valley that the latter species has little chance at present. The California requirement of $1\frac{3}{4}$" thickness for nominal 2" dimension as against 1-9/16" Eastern also makes the production cost of white fir dimension higher, both in reduced lumber yield and by the necessity for carrying a double stock for local and Eastern trade, that the largest fir producing mill tributary to the Sacramento valley has discontinued the cultivation of the California market and cuts only for Eastern shipment. The only exception of consequence among Sacramento valley mills is the Diamond Match Co. at Chico, California, which is able to market its own cut of white fir in that valley because it has under its own ownership a large string of retail yards, and these in many cases have little or no local competition.

Mill Scale Study

A second activity which contributed considerably also to the white fir problem was a mill scale study carried on by the offices of Forest Management and Products at the mill of the Madera Sugar Pine Co. This study was undertaken primarily because of this company's complaint of a heavy underrun on Forest Service timber. While the detailed results have not yet been computed, it is apparent that much if not most of the underrun complained of is due to faulty manufacturing practice, especially excessive sawing allowance for subsequent shrinkage and surfacing, and careless trimming. In the case of white fir the effect of the former practice is aggravated by the excess dimensions cut by this mill for its San Joaquin valley trade. The situation found at this mill makes it appear that one of the most profitable lines of future Products work would be the study of milling practice in connection with lumber depreciation, as related to wood waste.

Wood Preservation

Request for further cooperation in exposure to marine borers of materials treated with various preservatives has been received from the Laboratory, and a similar request from the promoters of one of two new preservatives which have recently bobbed up in this territory. Rumors of a new pressure preservative plant in the vicinity of Oroville were investigated and found to be unfounded.

White Ants

One of the most portentous developments in respect to building construction and the use of lumber was brought to light by a trip by Mr. Hill to Pasadena, where newspaper reports have indicated considerable recent excitement in respect to damage by white ants. Intelligent and careful investigation by the newly reorganized Department of Building Inspection of that city leads them to believe that building to the equivalent of 50% of the whole number of every type in the city are seriously attacked. Wooden portions of concrete buildings suffer apparently not less than all-wood construction. Imminent collapse has been only narrowly forestalled in a number of important commercial buildings. Mr. Hill saw enough of the actual damage to convince him that the danger of catastrophe is very real. Most laymen when they see the damage at all attribute it to dry rot and greatly underestimate its extent and seriousness. Even the building officials of surrounding municipalities - including Los Angeles - think Pasadena has become hysterical over a relatively small matter; but there is no reason whatever to suppose that other cities of that region are in any less danger than Pasadena. They just do not know what a powder magazine they are blowing smoke rings above; and whether they will be awakened short of a fatal "blow-up" in their midst is problematical. The situation is complicated by many features in which the termites (mostly the subterranean Reticulitermes in building construction) do not behave as stated in the current literature, and by the determined efforts of real estate boards and similar bodies to hush up any publicity of the significant facts, which alone can bring adequate public action. The situation calls urgently for immediate study by the Bureau of Entomology, the Forest Products Laboratory and this office, as well as by every other cooperating agency that can contribute to its solution.

Pulp and Paper

Two developments are of interest. The Chamber of Commerce of Oroville is negotiating with San Francisco interests in respect to the location of a sulphite plant at that place. The second development is that a Mr, Bryan, who has been connected with the eccentric originator of the Thomas pulping process in Portland, is trying to finance an ambitious pulp and paper plant at Fresno, California, one of whose phases contemplates manufacture of sulphate paper out of grape vine clippings and raisin stems.

Economic Research Council

The semi-annual meeting of this council occurred on October 29 at Los Angeles. Mr. Hill was able to report for the Committee on Natural Resources two specific recommendations for Council action both relating to soils research, these being both approved by the Council and being the first presented by any Committee; as well as progress in other directions, including forestry and climatology projects.

Miscellaneous Activities

The District training school took a large part of Mr. Hill's time during September and October, in sessions of the District Training Committee and preparation of personal instruction material, and in attendance at the school during the first two weeks of October. He gave instructions in forest paleobotany, dendrology and forest economics covering about 7 hours and in Products covering 1½ days.

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OFFICE OF PRODUCTS - DISTRICT 6

General Survey of Woods Waste in the Douglas Fir Region

One of the camps of the Crown Willamette Pulp and Paper Company at Cathlamet, Washington, was completed in the survey and the re-logging operation which is in operation at the other camp of this company was examined. Heavy rains stopped the work, and because of the lateness of the season and uncertain weather conditions it was decided to terminate the field work for this year.

This re-logging operation is very interesting, because worked out along original ideas and a new development in the region's logging industry. From 7,000 to 10,000 B.F. per acre, or about 15 per cent of the original stand, is being recovered by means of the light machinery which is in use. Mr. Hodgson secured information and photographs that will enable him to cover this operation in an article for publication.

Felling and Bucking Study

Mr. John Newlin, Forest Products Laboratory, spent the first half of October in the District, visiting several Douglas fir logging operations primarily for the purpose of observing the felling and bucking of timber. Messrs. Hodgson and Koroleff accompanied Mr. Newlin on the first part of his trip into the woods, Mr. Gibbons on the latter part. Messrs. Newlin and Gibbons also visited several wood-using industries, especially those utilizing western hemlock.

As earlier suggested, a felling and bucking study in the region will probably be made, following the completion of the "General Woods Waste Survey in the Douglas Fir Region." Mr. Koroleff is paying particular attention to the felling and bucking operation, largely with the working plan in mind, and it was from this angle of the proposed work that Mr. Newlin made his woods observations. The general plan is to make this study as comprehensive as feasible, and it is fortunate that Mr. Newlin could visit the District and study the project on the ground. He doubtless will be able to contribute materially to the development of the working plan.

Air Seasoning of Western Lumber

In connection with the preparation of a bulletin dealing with the air seasoning of western lumber Mr. Fullaway of District 1 spent the month in this District, being accompanied in the field for the most part by Mr. Johnson. Early in November Messrs. Fullaway, Hill and Gibbons meet at Klamath Falls, at which time the general form and content of the bulletin will be discussed.

White Fir Study

Some progress was made on the white fir study during the month. On the basis of present knowledge this wood, in western Oregon and Washington, is only utilized for box shooks, boards, and dimension.

Public Relations

Mr. Hodgson's article, "One Solution for the Woods-Waste Problem," mentioned in the September report, was, at the suggestion of the District Forester, sent to the Editor of the Sunset Magazine. The title was changed to "Forest Thrift."

Mr. Hodgson has prepared another signed article entitled, "Saprophytic Tendencies of Western Hemlock" for publication. Some very striking photographs are used to illustrate this article, some of which indicate how the roots of western hemlock will resist gravity and will work their way for many feet upward through the sapwood of decomposing snags, apparently for no other purpose than to secure nourishment from the rotting wood. The author believes that in this respect he has recorded a newly-discovered scientific fact.

The first of four articles dealing with the air-seasoning of lumber in the Douglas fir region, by Messrs. Gibbons and Johnson, was printed in the October issue of The Timberman.

While in Vancouver, B. C., in attendance at the Pacific Logging Congress, Mr. Gibbons read a paper, "Forest Products Research of the Forest Service" before the Canadian Society of Forest Engineers.

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Market Conference

On October 29 the Department of Commerce called a conference on marketing research to discuss and adopt a priority list of fundamental research projects in the field of marketing. Subjects pertaining to one commodity or to one function of marketing were eliminated from the discussion. The meeting was held in the Department of Commerce building and was attended by representatives from a great many associations and large companies. Interest in the conference was manifest throughout.

The following recommendations were adopted by vote of those present.

1. Recommendation of a census of distribution.

2. Creation of a committee of Washington bodies to coordinate the work being carried on by the Government on marketing studies and statistical analyses.

3. The appointment of a Central Committee to make recommendations for priority list and for ways and means of accomplishing the specific items listed.

4. That the work of these two committees be organized and coordinated by the Department of Commerce.

5. That the members of the conference should interest themselves in the formation of local groups of those interested in market research to serve as advisory bodies to the Central Committee.

6. That the central committee establish close contact with schools to suggest studies of the most practical use.

Stumpage Prices

There are two general types of stumpage sales on a price basis. One is the flat rate sale where all species are sold at the same rate, and the other the individual species price sale where a price is established for each species. The former is the method usually employed in regions where stumpage prices are not high and where inherent worth of the species is not clearly established. The flat rate type of sale is confined largely at the present time to the West and to some extent to the South, particularly in the sale of cut-over and second growth timber.

As the value of standing timber increases and as the supply of the most desirable species decreases in any region, the tendency is towards a greater use of the individual species price form of sale. In this type of sale there is no adjustment except in unit price to take care of the different values of species involved. The following tabulation shows the difference in the weighted average prices for both types of sales in the Pacific Northwest. The figures are averages of stumpage price reports for 1924 and 1925.

Species	All Sales		Flat Rate Sales		Species Price Sales	
	Price per M	Quantity M ft.L.S.	Price per M	Quantity M ft.L.S	Price per M	Quantity M ft.L.S.
All species	2.89	20,012,981	2.74	13,350,127	3.17	6,662,854
Douglas fir, virgin	2.97	13,052,336	2.78	9,214,367	3.41	3,837,969
" " second growth	2.41	339,176	2.39	39,444	2.41	309,732
Sitka spruce	2.91	901,630	2.58	654,374	3.79	247,256
W. red cedar	2.90	1,126,126	2.74	946,208	3.69	179,918
Western hemlock	2.40	2,956,976	2.60	2,272,828	1.72	684,148
White fir	2.70	147,824	2.83	79,218	2.54	68,606
Western yellow pine	3.23	1,803,315	3.07	173,616	3.25	1,629,699
Western larch	1.54	24,774	2.28	9,516	1.06	15,258

Except in the case of western larch there is little variation in the species prices in the flat rate sales. Here white fir and western hemlock bring practically the same price as spruce, fir and cedar. It is apparent that the price of the less desirable species is raised and that of the more desirable species is lowered to reach some sort of an adjustment. In addition there is frequently an adjustment in the cruise estimates also.

In the individual price species sales there tends to be a price gradation from the least desirable species at the bottom to the most favored at the top of the list. The relatively larger quantities of the minor species tend to bring down the average price for all species. But prices of the minor species have no direct bearing on the price of the more favored kinds.

The differences in the prices for all species is significant. These figures indicate that the adjustment of flat rate prices is carried too far, resulting in a decided advantage for the timber purchaser. The difference in price of $.44 per M feet amounts to a saving to the purchaser of about 14 per cent. It is a loss of an equal amount for the timber grower. It is obvious that the loss of 14 per cent is relatively more important to the seller or producer of standing timber than the $.44 gain to the purchaser, particularly if the latter is a manufacturer, for his final product, lumber for instance, sells at a much higher price than standing timber and the loss of $.44 would not form a large percentage.

Forest Taxation Inquiry

During September and October field work was completed in St. Louis, Lake, Hubbard and Beltrami counties. In each of these counties from four to six townships were selected for detailed study, which will later be made the basis of careful analysis to determine all factors affecting the taxation of lands of both forest and agricultural value.

Mr. Murphy has prepared analyses of the income and expenditures of these four counties to show the financial problem which they face.

For each county complete statistics of tax delinquency have been worked up for the unplatted property and data gathered on the character of ownership.

Mr. Chapman prepared brief abstracts of the studies made in these counties as a basis for talks at the county seats of St. Louis, Lake and Beltrami counties during the month of October.

On November 1, the work was concentrated in St. Paul for the working up of the data.

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GRAZING RESEARCH

The Range and Livestock Situation in the West

Range forage has been short this season throughout most of the range area. The Northwest and California were effected early and many sheep had to leave the Forests before the close of the season because of the exhaustion of the forage supply. Conditions throughout the Rocky Mountains and the Southwest were fairly satisfactory during most of the summer but the drying winds have reduced much of the winter range supply throughout Montana, Wyoming and Colorado. It appears, therefore, that there will be a shortage of feed on the winter ranges throughout most of the West. The dry conditions have forced an unusually heavy marketing especially of sheep. Lambs which were contracted early sold at from 10¢ to 12½¢ per pound, but later sales have been less, and in dry areas some lambs have sold as low as 8½¢. Although the stocker and feeder market for cattle is approximately the same as last year at the central markets, prices for cattle throughout the western range area have been slightly below that of 1925. Mohair is selling at a price which allows excellent profits where good methods of production are followed and Angora goats are in demand.

The Texas Ranch Experiment Station

The Texas Ranch Experiment Station is located 30 miles south of Sonora on the Edwards Plateau. It is a rather typical ranch of the region containing 5 sections of land. The buildings are mostly of concrete and consist of the Superintendent's home, a house for assistants, general office, veterinarian's office, hospital, and barns. The water supply is furnished by a deep well and a concrete reservoir. A very elaborate system of lanes and corrals have been constructed in order to facilitate handling and weighing of the livestock.

Cattle, sheep, and goats are grazed loose in pastures of wolf-proof woven wire fences. The experimental work is mainly of an animal husbandry character, including the study of selection and breeding, parasites and diseases. The carrying capacity study consists largely of a test of the ability of the range to carry the equivalent of 70 cow units, to the section in the ratio of 31 cattle, 175 sheep, and 100 goats. Careful records are kept of the weight of all animals as they are transferred from one pasture to another and the total weight of each class during the month is used as a basis for checking against the original plan of stocking. Though the unit was originally based on cows weighing 750 pounds, the average cow at the Experiment Station weighs approximately 900 pounds, which is larger than most of the cows in the region.

A careful study is also being made of the grazing habits of each class of animal by observing individuals through a 24-hour period once a month. Records are also being kept in a general manner and by large specific areas as to whether the range forage is being maintained. The records indicate that curly mesquite is by far the most important forage plant at the Station, furnishing the bulk of the feed for all classes. Cattle graze it as their main feed throughout the year. Sheep graze it most when green, but it furnishes much of their feed even when dry. Goats graze it most in the spring when green and tender, but they make some use of it later. Weeds when present, especially in the spring, are of considerable value for sheep and goat feed. The oaks, chiefly live and skin oaks, furnish the bulk of the feed for the goats in the winter and also an appreciable part of the feed for cattle, but are grazed relatively little by sheep. Sachuista, or bear grass as it is known further west, is closely grazed each year. The flower stalk buds are eaten as they appear, but the sachuista leaves are ordinarily not heavily grazed until the grasses are closely grazed or dry.

Soil on the range is shallow with considerable limestone outcrop. The bottoms with rather deep black soil are farmed for the production of supplementary feed. Ordinarily a rather large supply of sorghums or johnson grass hay is produced. The Station also has one field in spineless cactus, a native species from Mexico, that is producing very well.

Rainfall was very good this spring and unusual growth of curly mesquite and weeds occurred, but within the Station pastures there has been scant rain this summer and when I was there the spring feed that remained was dry, and very little, if any, summer or fall growth was in evidence. The adjacent ranges are stocked more heavily than the Station and feed was much shorter on these ranges. As a result of the drought the livestock, especially cattle, were in very poor condition. Several miles south of the Station very satisfactory rains have occurred recently and the fine new growth of curly mesquite made the range appear as though it had been seeded like a cultivated field. This would indicate that the long-growing season (fairly good growth may occur in all but about two months of each year if rains are sufficient) is one of the main reasons for the high grazing capacity.

As is the case further west cattle are barely paying expenses, if that. Sheep are doing very well. The most profitable class of livestock at the moment is the Angora goat. Many ranches in the region are cutting down the number of cattle carried and increasing the number of goats.

Washington

Mr. Chapline Returns

Mr. Chapline returned the last of October from his summer's inspection trip. During October he made return visits to the Jornada and Santa Rita Range Reserves for the purpose of giving more thorough attention to reports and publications being prepared than he was able to give during the short stop with Messrs. Clapp and Marsh. The excellent condition of the cattle on the Santa Rita, in spite of the dry summer, attests the value to the livestock industry of a conservative stocking sufficient to furnish a reserve supply of feed in practically all years. One of the most striking contrasts noted in the West is the rapid recovery and excellent stand of grama grass on the Jornada Range Reserve this year as compared to the very slow recovery, shortage of grama, though abundance of weeds in the grama type near Deming, New Mexico. In 1915 the forage on the two areas was much alike but by 1924 the Deming area was much more seriously depleted and excessive wind erosion has resulted.

Mr. Chapline visited the Texas and Tennessee Experiment Stations and attended the Southern Forest Research Council Meeting on his way to Washington. He was particularly impressed with the apparent difference in growth of longleaf pine on the burned and unburned areas at McNeill, Mississippi, and also with the close use that cattle are making of the piney woods forage both that which has been burned and that protected. The longleaf pine has made such a growth in the last four years that the appearance of the country is completely changed.

Cattle Poisoning by Pine

Dr. C. Dwight Marsh, in charge of poisonous plant investigations of the Bureau of Animal Industry, states that, while there is no confirmatory experimental work in the premises, yet there is no doubt but that cattle have been poisoned by eating the foliage of western yellow pine. In the past numerous reports have been heard from the stockman about livestock getting scours and pregnant cows aborting due to eating pine needles, but this seems to be the first authoritative statement we have had as to toxic effects of pine foliage on livestock. Perhaps, if the silvical geneticists will develop a sufficiently virulent race of western yellow pine, this will automatically solve the pre perennial problem of grazing vs. yellow pine reproduction!

Publications

Sampson and Malmsten's "Grazing Periods and Forage Production on the National Forests" Dept. Bul. 1405 is now in print and available for distribution.

The manuscript for a department bulletin, "Important Western Browse Plants," by W. A. Dayton has now been reviewed by the members of the Board of Review.

Plant Identification

Twenty plant collections, representing 398 specimens, were submitted during the month to the Bureau of Plant Industry for formal identification. Twenty-three collections, with lists of identifcation and economic notes, were reported on to the District Foresters, Experiment Station directors, etc., during the month. Four hundred and forty-four plant specimens were mounted during the month.

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Moved to Ogden for the Winter

With the completion of field and laboratory work for the season at field headquarters the last week in October, the Station force departed on October 30 for Ogden, Utah, where winter quarters will be maintained in the District Office. For the first time in years, owing to the lack of snow, it was necessary to leave a caretaker at the Station to safeguard the Government property. Ordinarily there is sufficient snow on the ground by November 1 or shortly thereafter to reduce travel on the mountain road near the Station, to a point that there is no danger in leaving the Station unguarded. This year, however, there has been practically no snowfall during October and the ground was bare on November 1, with prospects of a continuation of this condition for some time. Mr. Frank Stevenson, who has been with the Station every summer for fourteen years, was left in charge.

Investigative Work

The odds and ends of the field work of the different projects were caught up and completed during September and October. All quadrat charting, the detailed browse growth measurements and plant vigor cuttings were completed. The data on these projects show a material decrease in vegetative growth during 1926 due to deficient precipitation.

Considerable time in October was spent in the office weighing grass samples of the plant vigor study and compiling data of the various projects. An occasional day was spent in the field work completing some phase of a project that had been left until the end of the field season. Plant development studies were continued through both months at regular intervals at the established stations.

An interesting observation during the past field season was that of the work of some insect, probably one of the cicadas, on the 1925 browse twig growth. The infestation was not confined to any particular species but all our browse species, viz., the common rose, serviceberry, Gambel's oak, bitterbrush, birchleaf mahogany, wild apple, and snowberry were infested. The work of the insect consisted in puncturing the bark of the twig in as many as seven places in a longitudinal row and laying its eggs in the inner wood of the twig. The rupture of the twig of the thin stemmed species was of sufficient depth that the slightest pressure will break it off. The infestation means a considerable setback to the growth of the browse since two years' growth has been practically destroyed. Such thicker stemmed species as the Gambel's oak may survive the infestation since it is believed that it will be able to heal over the punctures. Very little infestation of 1926 browse twigs was noted, only two species, viz., Gambel's oak and wild apple, showing the work of the insect.

The Weather

The reader of the Monthly Report, since grazing research came into the family, will doubtless have noted the frequent reference to the weather and especially the rainfall, in the contributions from the range stations. Weather is not selected because of the absence of more interesting topics, but because the weather, or in other words climate, from month to month and season to season is a matter of first concern to the range investigator and the range user. The forage crop with which grazing studies have to deal is an annual one and its growth and production, reproduction and the establishment of seedlings, is closely associated with the seasonal climatic conditions. Moreover, the number of livestock, condition of the animals grazed and the effect of grazing upon the maintenance of forage production are materially affected by the weather as it affects growth. Hence the grazing investigator, like the Texas range man, has developed a peculiar habit of frequently glancing skyward to note what the weather man is sending from day to day.

The weather has come to be recognized as such an important factor in the outcome of all of the projects at the Great Basin Station and in range use and range management generally that a separate project known as "Climate and Plant Growth" has been set up to deal specifically with this factor. Briefly, its objects are to determine the part climate, and especially fluctuations in climate from season to season, plays in forage growth and production and what adjustments are required in range management to successfully meet, from the standpoint of both range and livestock, the fluctuations in forage production as the result of climatic variation.

At one time it was taken more or less for granted that drought was significant from the range standpoint only in the Southwest, where even the most casual observer is impressed by the variation in rainfall from year to year, or over one period of years as compared to another. The observations already made at the Great Basin Station indicate the importance of a careful study of this problem in the Intermountain region. For example, it has already been shown that the size of the forage crop may vary from as much as 33 per cent below the average for a period of years in a comparatively dry year like 1924 to as much as 25-30 per cent above the average in a wetter than average year like 1925. These conditions are not as severe, perhaps, as in the Southwest where the variation is even greater but nevertheless is a matter to be dealt with in range use, especially in determining carrying capacity.

The year 1926 with a precipitation of approximately 25 per cent below normal for the growing period (May-September) inclusive has been another with forage growth considerably below the average. Its bad effects in the vicinity of the Station were made easily apparent by the fact that many bands of sheep were forced to leave the range two weeks to ten days before the close of the grazing season and by the overutilization on many allotments even though the stock left early.

Dixie Browse Study

Nelson spent from September 9 to 11 on the experimental browse area on the Dixie Forest accompanied by Supervisor Olsen and Ranger MacFarlane. Observations and measurements were made on the 1926 herbaceous and browse growth to note rate of recovery after one season's rest from grazing. It will be recalled that this experimental area had been closely grazed for 5 years to determine the possibilities of obtaining reasonably full use of various browse species by cattle but that grazing was excluded during 1926 to restore the vigor to the vegetation for other studies.

The important browse species made very little recovery during 1926. This was partly due to the drought conditions existing on the browse area the past growing season, but the effect of overgrazing in the past was also readily apparent. What growth took place occurred immediately after the early spring precipitation.

Gambel's oak on a plot protected against grazing for a number of years made slightly greater growth in 1926 than in 1925, in spite of the drought. On the plot that had been closely grazed from 1921 to 1925 there was 63 per cent less growth in 1926 than on the protected plot.

Birchleaf mahogany (Cercocarpus montanus) made 43 per cent less growth in 1926 than in 1925 on a plot that had been protected for 5 years, while on a plot that had been protected during 1925 and 1926 there was 51 per cent less growth this year as compared to last. On a third plot protected against grazing during 1925 and 1926 there was 27 per cent greater growth in 1926 than in 1925 in spite of the drought. This species made an average of 45 per cent less growth in 1926 on the plots that had been grazed heavily prior to this year as compared to that on the plots protected against grazing for 2 to 5 years.

Bitterbrush (Purshia tridentata) made better growth than birchleaf but at that, varied in amount from 26 to 40 per cent less than last year. Growth on the plots grazed very heavily prior to 1926 was 45 per cent less this year than on the permanently protected plots.

Red serviceberry (Amelanchier rubescens) on protected plots made 43 per cent less growth in 1926 than in 1925, probably due to drought, but growth on the plots that had been subject to grazing prior to 1926 was only 10 per cent less than on the long time protected areas. This species is much less palatable than the other species and had not been very closely grazed at any time prior to this year of protection.

In general, it is very apparent that the deficient precipitation this year materially reduced growth the past season but of greater significance still is the lesser growth of the more palatable and overgrazed species on the plots that had been grazed for several years prior to 1926. The overgrazing of such species as birchleaf mahogany and bitterbrush apparently had reduced the vigor of the plants to a point that will require one or more seasons of protection for recovery to a point where normal growth will be made. Red serviceberry, on the other hand, which had not been overgrazed in the past made almost as much growth on the unprotected areas as it did on the fenced plots. It follows also that in dry years on overgrazed browse ranges there will be a much greater proportional deficit in forage production due to overgrazing and drought combined than there will be on similar ranges when the vigor has not been impaired by overgrazing. Hence, overgrazing is very much intensified on over-used ranges in dry years.

Artificial Reseeding with Native Species

That depleted range lands may be increased in value by the introduction or sowing of seed of valuable forage plants is one of the first ideas that suggests itself to the average uninformed person in considering range improvement. Artificial reseeding is one of the oldest projects in grazing research and so far only very limited conditions have been found where artificial reseeding can be done economically. Most of the work in the past has been done with the cultivated or so-called "tame" species. In general, these species are not adapted to the short growing season of the higher elevations where there is ample moisture or to the inadequate moisture at the lower elevations. At that, however, the problem is by no means fully understood and the field is a fertile one for study.

One of the fields of investigations in artificial reseeding which suggests itself is that of using native range species. Such plants would certainly be adapted to local growing conditions. The main problem associated with their use is the ascertaining of which species are adaptable to seed production on an economical basis and to such requirements of cultivation as are met with in range practice. Large mountain brome grass (Bromis polyanthus), violet wheat grass (Agropyron violaceum) and slender wheat grass (A. tenerum) have already shown their adaptability to range use. Of these, slender wheat grass is the only one for which seed can be procured from commercial seed houses and that only to a limited extent. An effort is now being made by the Great Basin Station, in cooperation with the Utah Agricultural College, to determine the possibilities of economical production of seed of the other two species. In addition, the Great Basin Station is trying out a number of other native western species for use in range reseeding. These include Poa wheeleri, Bromus marginatus, B. carinatus, B. pumpellianus, Aira caespitosa, Agropyron spicatum, Festuca idahoensis, an undetermined species of Festuca, and Hedysarum sp. There are many more native species that should be tried out as soon as facilities will permit.

There are two other broad fields of investigation in artificial reseeding that have barely been touched. These are plant introductions from foreign countries and breeding and selection of plants suited for forage on western ranges. In addition, much remains to be done in the study of soil and other site conditions suitable for artificial reseeding as well as giving more thought to cultural methods, time of seeding, etc., even for tame species that have already been tried out under empirical methods. There is still a big field in artificial reseeding research.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

Growing conditions have continued very favorable during the month which is quite unusual for this time of the year. During the first week in October, several good rains occurred which on an average totaled approximately one inch of precipitation over the entire Reserve. Since the temperatures during the first two weeks of this month have been sufficiently high, growth has continued to the extent that a fall weed crop has started and both grama and tobosa grass have put forth a considerable number of late flower stalks, together with a considerable amount of new leafage. On a few of the more favorable sites there has been this year practically three crops of flower stalks. Although this late growth is hardly sufficient to increase the forage crop to any great extent, it has caused the vegetation particularly on tobosa types to remain in a palatable condition much longer than is ordinarily the case.

Investigative Work

The greater part of the month has been devoted to quadrat work. With the exception of the clipping study quadrats which are still making some growth, all of the quadrats which have been scheduled for this season have been charted. Comparison of the quadrat sheets on practically all types this year with those of last year show with few exceptions a marked increase in density of the important forage species especially grasses. The snakeweed plots show a marked decrease in this species and the number of seedlings this year is much less than has been the case for the past two or three years.

Cattle Work

Calf branding has been in progress on the Reserve during the past two weeks. The calves this year are an exceptionally fine lot and judging from the numbers that have been seen and from the number that has already been branded, the calf crop will in all probability equal or exceed 75%. Several cattle sales have occurred in this locality recently, all of which have been calves. Good calves this fall are bringing on an average of $24.00 per head for both sexes. There are practically no steers or aged cattle of any kind for sale in this section of the State this year.

Rodent Control

At the present writing the U. S. Biological Survey is carrying on a rather extensive campaign of kangaroo rat extermination on the Reserve, which will cover the area treated in 1924. The work is being carried on under the direction of Mr. A. E. Gray, Leader of Rodent control, whose

headquarters are at Albuquerque, The field work is being supervised by Mr. John Gatlin, who is well known as a veteran at this kind of work. A crew of 7 men are engaged in the poisoning operations which will require a period of at least 6 weeks to complete. This work is being done by the Biological Survey as an experimental enterprise and since they have chosen the Jornada for the experimental area and are bearing practically all of the expense this work is indeed highly appreciated by the Forest Service.

Visitors

Mr. Chapline returned to the Jornada on September 30, apparently none the worse off from the accident which occurred to his eye on his recent visit. He was busily engaged until October 5, in going over projects and making field inspections with Schoeller. The afternoon of October 4 was spent in conference with Mr. Waggoner, the Jornada Cooperator.

Director Pearson of the Southwestern Forest Experiment Station made good his promise of several years standing by visiting the Jornada October 27 to October 29, inclusive.

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Gains Made by Lambs Grazed on Douglas Fir Cut-over Lands

Profit in the use of Douglas fir cut-over lands by sheep is of primary importance to the sheep owner. It is of importance to the forester because as a reducer of fire hazard it must first be profitable to be usable.

As a means of measuring the profit to be expected from the use of Douglas fir cut-over lands for sheep grazing, a number of lambs from an experimental band on the Columbia National Forest were weighed periodically during the summer of 1926 and the gains recorded. On June 8, 1926, when the sheep entered the cut-over area, 50 lambs were selected, 40 being average lambs and 10 the largest and fattest. The two lots were weighed separately with steelyards. They were weighed again on July 30 as they were moved from the cut-over range to high range, again on September 4 as they were returned to the cut-over range, and finally on September 20 when they were driven to the railroad for sale. The weights and gains were as follows:

Dates Weighed	No. of Days	Type of Range	40 Average Lambs Pounds per Head		10 Top Lambs Pounds per Head	
			Weights	Gain per day	Weights	Gain per day
			lbs.	lbs.	lbs.	lbs.
June 8			48.12		61.9	
July 30	52	Cut over	66.00	.344	78.7	.323
September 4	36	High range	69.27	.091°	82.3	.100
September 20	16	Cut over	71.75#	.155	82.7	.025
Average				.227		.200

°Eliminating 2 lambs orphaned during the summer, which weighed as a result 51 lbs. and 47 lbs. (not representative of average lambs) the average was 70.34, a gain of 4.34 lbs. in 36 days, or .121 lb. per day.

#Likewise eliminating the orphaned lambs, the average weight on September 20 was 72.79, an average gain of 2.45 lbs. in 16 days, or .153 lb. per day.

Better than one-third of a pound a day during the period from June 8 to August 1 is clearly a satisfactory gain and was so considered by the owner. Against the greater fattening and milk producing value of the feed on the cut-over land as compared with the high range must be figured the

normally quicker gain of the younger lambs. The season as a whole was extremely dry. No "check" band of similar breeding was available for direct comparison, and, with all the factors that have to be considered, interpretation of the one season's figures is difficult. But the average gain of these 50 lambs during the periods when they were grazed on the Douglas fir cut-over land, 19.72 pounds, applied to the 1,000 lambs sold from the band in which these lambs were grazed, at the selling price of 11 cents a pound, means a gross value of $2,169.20 for the gains made. This may be regarded as the owner's gross return in lamb production for the period while grazing the cut-over area. There was of course in addition the value of the wool produced. With an average final weight of 73.94 pounds the 50 lambs sold for an average of $8.13 per head. When applied to the 1,000 lambs sold it gives gross returns from the lambs of $8,133.40.

The statement of the cooperator in this experiment and the owner of the sheep, Mr. Ed McGreer, is significant, that of three bands which he summered this year, one on the Ochoco (Blue Mts.) and the other on the Santiam (Cascades) and this, the third band, on the Columbia Forest, the Columbia lambs made far the greater gains, actually outstripping the other two bands in gains and in final weights, in spite of the earlier handicap, due to the Columbia lambs being the tail end of the lambing. The Ochoco lambs, as a result of the dry season, secured only one month's forest feed (July 1-August 1) and were held on alfalfa pasture thereafter, weighed an average of 66 lbs. when sold. The Santiam lambs weighed slightly less than this. Whether lambs on cut-over range will do this well every year, and in fact, just what the difference is in gain between lambs of similar breeding, age, size, etc., is a matter which can be determined only by further cooperative study. There is, as a matter of fact, a dearth of accurate information as to what normal gains on summer feed really are. Losses on the experimental band (a total of 43 head, approximately 2%) were likewise considerably under those sustained on the bands on the Ochoco and Santiam ranges.

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THE EDITOR

One author in the field makes a plea for standards "for use in the preparation of figures or graphs, in designating headings and subheadings, in the general style of the bulletin, abbreviations, bibliographies, and footnotes."

This is rather a large order, but the following is an attempt to supply very briefly the desired information, much of which has already been supplied to the Forest Experiment Stations in one form or another.

Photographs

Photographs should be numbered "Plate I" or "Plate I, A and B," the plate being determined by the order of reference in the text.

The plate number and title, together with the photograph number, should be written in the text at the end of the paragraph containing the first reference, and should be separated from the text by a ruling or a 3 or 4 line space.

The title and plate number should also be written on the back of the print, which should not be mounted.

Photographs are printed either normal to the page or broadside. When printed normal to the page, they must be reduced to a width of 4-1/8 inches. A single illustration may be from $5\frac{1}{2}$ to $6\frac{1}{2}$ inches deep. If two are on the same page they may be from 2 inches to $3\frac{1}{4}$ inches deep, but the total depth cannot well be over 6 inches. Photographs run broadside are usually 4 inches deep. If there is only one to a page, it may be from 6 to $7\frac{1}{2}$ inches wide. If two are on the same page each may be from $2\frac{1}{4}$ to 4 inches wide, provided the total width is not over 7 inches.

These dimensions will give an idea of the proper proportions for suitable reduction, which can be very easily worked out with a slide rule. Photographs should not, however, be trimmed before being submitted. Any preferred cuts can be indicated lightly in pencil on the back of the print.

Figures or Graphs

Figures shouldbbe numbered consecutively throughout the bulletin, and the number and title of each be inserted in an appropriate part of the text.

In practically all instances it will be necessary to re-trace all drawings here. For this reason care need be taken only to make the drawings accurate. However, the general proportions of the drawing should be such as will fit well an ordinary bulletin page, so that they can be re-traced without replotting. The proportion should generally be about 3 to 4, or 6 to 9.

Drawings should be made, if possible, about twice the size to which they would be reduced in printing. That is to say, about 9 inches wide, ordinarily. There is no need to prepare them on a larger scale unless the graph is very intricate.

Headings and Subheadings

The headings should be arranged in the order of importance by the author. Just what style of typing is used to indicate the order of headings does not matter particularly as long as the headings of the same value are in the same style. With each manuscript a table of contents should be submitted that shows all headings indented in their order of importance.

Abbreviations

For style of abbreviations, consult the Style Manual of the Government Printing Office. In most instances reference to a recent bulletin will serve to indicate the style for such abbreviations as we need to use.

Bibliographies

The following three examples will give the style for bibliographies, which generally appear under the title "Literature Cited:"

(1) Frothingham, E. H.

1912. second-growth hardwoods in Connecticut. U. S. Dept. Agr., Forest Serv. Bul. 96, 70 pp., illus.

(2) _____

1924. some silvicultural aspects of the chestnut blight situation. Jour. of Forestry 22: 861-872.

(3) Gravatt, G. F., and Marshall, R. P.

1926. chestnut blight in the southern appalachians. U. S. Dept. Agr. Circ. 370, 11 pp. illus.

The numbers preceding the citations are the text references. In the text where reference is made to the bibliography, the number of the publication referred to is inserted as an italic figure in parentheses.

Footnotes

The footnotes should be inserted in the text directly beneath the line of the text in which the footnote reference number is inserted, but should be set off from the text by rules above and below the footnote.

Preparation of Manuscript

The manuscript submitted should be typed double space, with no paragraphs running over the page, if possible. In other words, the manuscript should not be crowded. The original copy should be on heavy paper. Two carbon copies should accompany the original, and wherever possible duplicates of all charts, photographs, and tables appearing in the original copy should be furnished with the carbons.

The tables should always be typed on separate pages from the text, each table following the page on which the first reference to it appears.

It is hardly possible to standardize the preparation of manuscripts any more minutely than this. Beyond this point, it is up to the author to indicate the style that he prefers, and to the Editor to decide to what extent the author's preference can be reconciled with the requirements of the Department and the Government Printing Office.

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